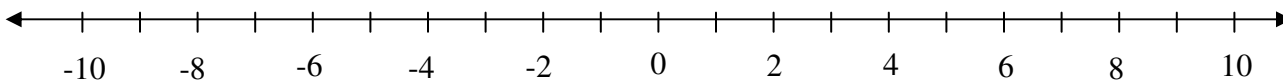


Lessons 23 Sections 4.2 and 4.3
3-part Inequality, Absolute Value Inequalities

3-Part Inequality: $2 < x < 10 \rightarrow x < 10$ AND $x > 2$

The number must meet both conditions, therefore the conjunction 'and'.

Where are these numbers on the number line?



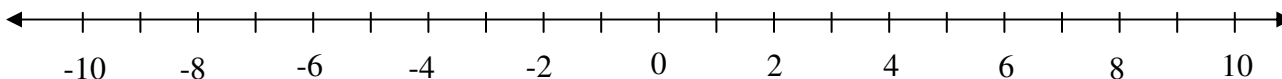
These numbers are between 2 and 10. This can be written as $2 < x < 10$, a 3-part inequality.

Solve the following:

1) $-12 < 3x + 4 \leq 12$

2) $10 > 3 - 2x > 0$

Examine this statement: $x < -3$ or $x > 2$ With an 'or' statement, only the first condition or only the second condition must be true. Where are these numbers on the number line?

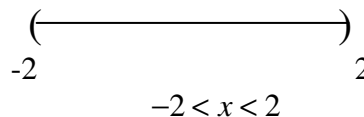


These are the numbers found in two 'rays' in opposite directions. Many students try to write this as a 3-part inequality: $-3 > x > 2$. However, this implies $-3 > 2$, which is false. This type of situation is not a 3-part inequality.

Examine: $|x| < 2$

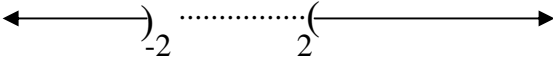
Solutions include $0, -1, \frac{3}{2}, -1\frac{7}{8}, 1.999, -1.87$ These are the numbers that are less than 2 units from zero.

Examine where these are on a number line:



Examine: $|x| > 2$

Solutions include $3, -4, 2.5, 3\frac{1}{2}, \frac{20}{3}, 2.01, -2.1$ These are numbers that are greater than 2 units from zero.

Examine where these are on a number line: 

$$x < -2 \text{ or } x > 2$$

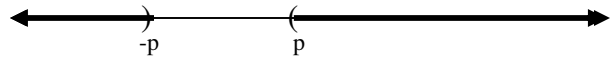
The above cannot be written as a 3-part inequality.

Absolute Value Principles (part 2)

1. $|X| < p$ $-p < X < p$



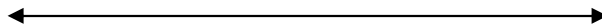
2. $|X| > p$ $X < -p$ or $X > p$



The above are true as long as p is positive. If p is negative, think!!! There will either be a solution of 'all real numbers' or 'no solution'.

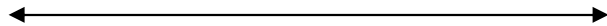
Solve the following. Write solutions using interval notation and graph.

12) $|r| < 12$



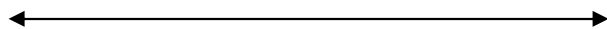
13) $|x-1| > 3$

Note: In place of an 'open' circle, we will now use a parenthesis. In place of a 'closed' circle, we will now use a bracket. Each will be curved in the direction of shading.

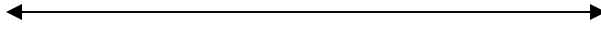


Note: The symbol for the word 'or' in interval notation is the union symbol \cup .

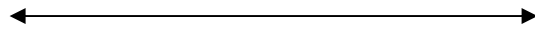
14) $|2x+3| \leq 11$



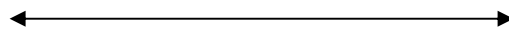
15) $|x-4|+5 > 2$



16) $|2a-5|+1 \geq 9$



17) $|6-2y| < 4$



18) $7+|4r-5| \leq 26$

